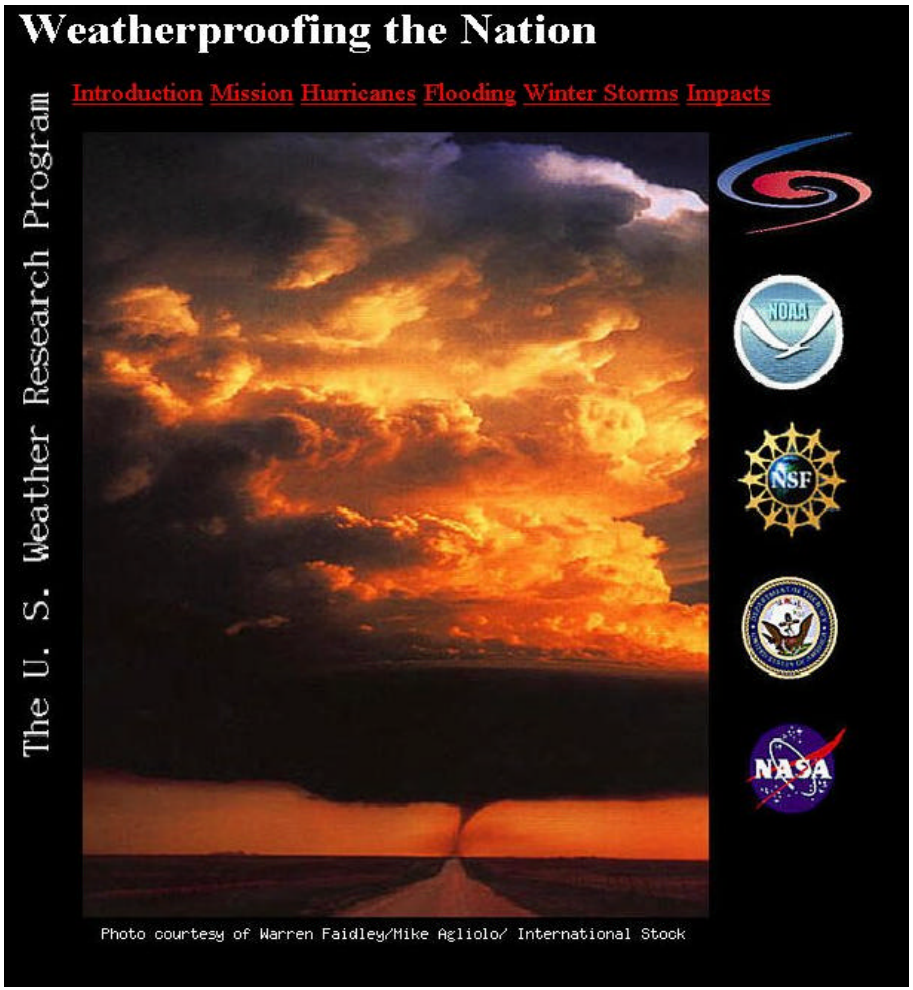
The NASA Short-term Prediction Research and Transition (SPoRT) Center



A Principal NASA Contribution to the U.S. Weather Research Program

SPORT

Motivation for the SPoRT Center

Goals:

- **Develop, evaluate, and *transition* near-real time experimental NASA ESE data products to operational use at regional scales.**
- **Develop a *framework to effectively transfer* experimental ESE-supported forecast and data products to forecasters at NWSFO's.**
- **Execute *high-resolution assimilation experiments* using ground- and space-based ESE observations in an operational environment.**
- **Develop metrics and *conduct assessment studies* with forecasters to evaluate the impacts and benefits of ESE-supported experimental products on forecast skill.**

Focus:

- **Regional scale encompassing more than one NWSFO**
- **Short-term prediction and 0 to 1 day forecast issues**

Relationship Between the SPoRT Center and the NASA/NOAA Joint Center for Satellite Data Assimilation:

SPoRT Center

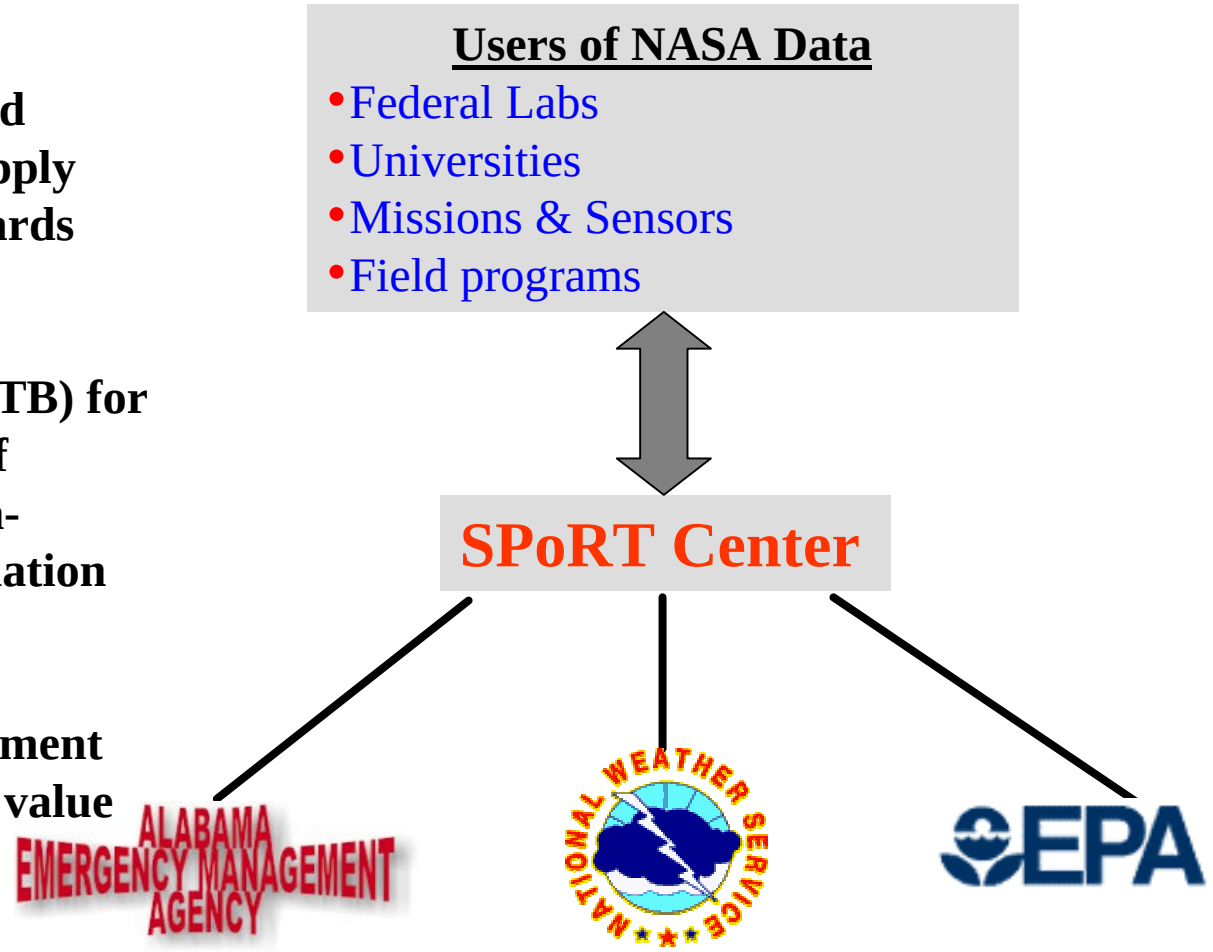
- Deals with regional scale modeling and observation networks
- Interaction with NWSFO
- Focus on 0- to 1-day forecast problem (includes Short-term Prediction)
- ESE GWEC Mesoscale Weather Observation and Research (Hazardous weather, QPF/QPE, cloud processes)
- USWRP goals 2, 4, 5, 6, 7, 10

NASA/NOAA Joint Center

- Deals with global/national scale modeling/observation network
- Interaction with NCEP/EMC
- Focus on 2- to 7-day forecast problem
- ESE Climate -Weather Connections, Extended Range Forecasting
- USWRP goals 1, 2, 3, 8, 9

SPoRT Center Functions

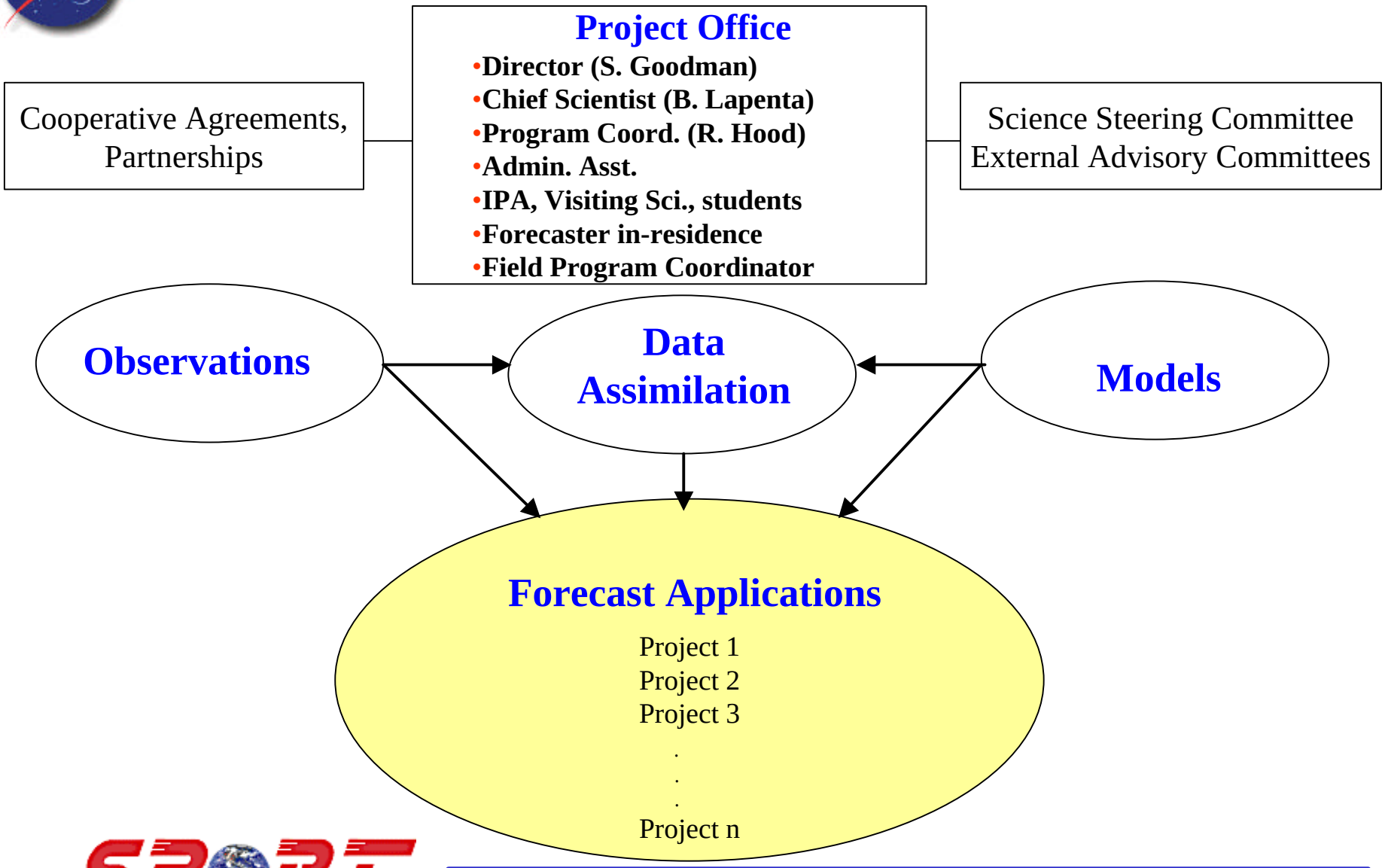
- **Provide scientific expertise and infrastructure to effectively apply NASA data and research towards improving weather prediction**
- **Provide Regional Test Bed (RTB) for operational implementation of experimental algorithms, high-resolution models, and assimilation systems**
- **Develop evaluation and assessment plans with NWS to determine value added**
- **Education and training of graduate students and NWS personnel**



SPoRT Center Activities

- Direct interaction with NWS Forecast Offices
- April 2002 workshop to discuss application of existing and future satellite products/local modeling
- Formation of a Science Steering Committee for Center
- Support field campaigns

SPoRT Center Structure



SPoRT Short-term Prediction Activities

Envisioned Benefits to NWS Forecast Offices…..

- **The WFOs can dispense with optical jukebox for archived level Level 2.**
  - ✓ **Real time ingest of NEXRAD radar data from Nashville, Birmingham, HYTOP, and Peachtree City (proposed) archived at SPoRT Center and sent to National Climatic Data Center (NCDC) in near-real time**
  - ✓ **HYTOP is now sent to NCDC with a greater percentage of archived scans than the jukebox methodology is providing.**
- **The real time Level 2 radar data will be assimilated into models (currently MM5, WRF later) whose graphical output can be provided via the Internet and through AWIPS to the WFO's.**

SPoRT Short-term Prediction Activities

Proposed Interactions in the HSV WFO Collaborative Research Area

- **NASA's Lightning Imaging Sensor Demonstration and Display (LISDAD) II system ingests satellite, Level 2 NEXRAD, and total lightning to identify, track, and characterize potentially damaging wind and tornadic producing storms**
  - ✓ **Provides detected positions and forecast of boundaries that may interact with storms and storm convective tendency**

- **NSSL's Weather Decision Support System (WDSSii) will produce improved precipitation estimates using mosaic under the radar umbrella (within 105 km of the radar).**

- **NASA and NOAA satellite data over the Alabama-SE U.S. domain covered by these radars.**
  - ✓ **Tropical Rainfall Measuring Mission (TRMM) Precipitation Radar bias adjustment of NEXRAD reflectivity and improved rainfall estimates**

- **Training and daily interactions**

SPoRT Mesoscale Modeling Activities

Envisioned Benefits to NWS Forecast Offices…..

- **Provide NWS decision makers with improved short-term (0-12h) high-resolution numerical guidance**
  - ✓ **Quantitative Precipitation Forecasts**
  - ✓ **Surface Parameters**
  - ✓ **Hazardous Winter Weather**
  - ✓ **Fire Weather**

- **Gridded data can be used within Interactive Forecast Preparation System (IFPS)**
  - ✓ **Model data can be used for initialization**
  - ✓ **Forecasts provide spatial and temporal frequency/continuity**
  - ✓ **IFPS can use all gridded info available in AWIPS**

SPoRT Mesoscale Modeling Activities

Envisioned Benefits to NWS Forecast Offices…..

- **Advanced model verification procedures**
  - ✓ **Forecasters encouraged to review model performance**
  - ✓ **Implement useful products(quantitative and subjective)**
  - ✓ **Develop verification fields on same scale as model output**
  - ✓ **Display within AWIPS**

- **Training and daily interactions**
  - ✓ **SPoRT can play role of "regional expert"**
  - ✓ **Introduce Forecasters to "nuts and bolts" of local model**
  - ✓ **Show impact of parameterizations/DA through examples**
  - ✓ **Use forecaster insight to configure local model**
  - ✓ **Forum to discuss potential reasons for model success/failures**